

AMENDMENTS TO THE CLAIMS

This listing of claims will replace all prior versions, and listings, of claims in the application:

Listing of the Claims

1. (Currently Amended) A method for isolating and immobilizing at least one bioparticle of interest on an active electronic matrix chip device (~~wherein device, wherein~~ the device comprises: a substrate, individually addressable electrodes on the substrate, and a permeation layer overlying a plurality of the electrodes on the substrate, further wherein portions of the permeation layer over the electrodes form microlocations of the active electronic matrix chip device, further wherein at least one capture immunoreagent specific for the bioparticle of interest is attached to the permeation layer of the device at or between a plurality of ~~microlocations~~), microlocations, the method comprising:

- a) introducing onto the active electronic matrix device a sample solution containing the bioparticle of interest, wherein the sample solution is of a conductivity suitable for dielectrophoretic isolation of the bioparticle of interest;
- b) passing an alternating current through selected electrodes on the active electronic matrix chip device, wherein the electrodes are selected to produce areas of relatively high alternating current field strength and relatively low alternating current field strength at ~~predetermined~~ positions on the active electronic matrix chip device, wherein the alternating current is supplied at a suitable voltage and frequency for dielectrophoretic isolation of the bioparticle of interest, and further wherein the at least one capture immunoreagent specific for the bioparticle of interest are located at one or more ~~predetermined~~ positions of alternating current field strength at which the bioparticle of interest is predicted to aggregate; and

- c) maintaining the alternating current in (b) for a sufficient length of time to allow the at least one capture immunoreagent to bind to the bioparticle of interest, thereby immobilizing the bioparticle.
2. (Original) The method of claim 1 further comprising washing the permeation layer surface of the active electronic matrix chip device to remove undesired components of the sample solution mixture after step (c).
3. (Original) The method of claim 1 wherein the bioparticle of interest is detectably labeled.
4. (Original) The method of claim 3 wherein the bioparticle of interest is detectably labeled in an additional passive immunolabeling step comprising introducing onto the active electronic matrix chip device a solution comprising a detection immunoreagent specific for the bioparticle of interest, and incubating the solution on the chip for a sufficient time to allow the detection immunoreagent to bind to the bioparticle of interest.
5. (Currently Amended) The method of claim 3 further comprising a detection step wherein the presence or absence of the detectably labeled bioparticle is detected at one or more ~~predetermined~~ positions.
6. (Currently Amended) The method of claim 1 wherein the ~~predetermined~~ positions at which the bioparticle of interest is predicted to aggregate are at “~~aggregate~~” aggregate microlocations of the active electronic matrix device, wherein the at least one capture immunoreagent is attached at the aggregate microlocations.

7. (Original) The method of claim 6 further comprising the steps of:
 - d) introducing onto the active electronic matrix chip device a solution comprising a detection immunoreagent specific for the bioparticle of interest;
 - e) passing a direct current through one or more aggregate microlocations, wherein the electrodes under the aggregate microlocations are biased so as to attract the detection immunoreagent to the aggregate microlocations from the solution; and
 - f) maintaining the direct current in (e) for a sufficient time to allow the detection immunoreagent to bind to the bioparticle of interest at the aggregate microlocation.
8. (Original) The method of claim 7 further comprising a detection step wherein the presence or absence of the detection immunoreagent is detected at one or more aggregate microlocations.

9. (Currently Amended) A method for isolating and detectably labeling at least one bioparticle of interest on an active electronic matrix chip device (~~wherein device, wherein~~ the device comprises: a substrate, individually addressable electrodes on the substrate, and a permeation layer overlying a plurality of the electrodes on the substrate, further wherein portions of the permeation layer over the electrodes form microlocations of the active electronic matrix chip device); device, the method comprising:

- a) introducing onto the active electronic matrix device a sample solution containing the bioparticle of interest, wherein the sample solution is of a conductivity suitable for dielectrophoretic isolation of the bioparticle of interest;
- b) passing an alternating current through selected electrodes on the active electronic matrix chip device, wherein the electrodes are selected to produce areas of relatively high alternating current field strength and relatively low alternating current field strength at ~~predetermined~~ positions on the active electronic matrix chip device, wherein the alternating current is supplied at a suitable voltage and frequency for dielectrophoretic isolation of the bioparticle of interest, and further wherein one or more ~~predetermined~~ positions of alternating current field strength at which the bioparticle of interest is predicted to aggregate are at one or more “~~aggregate~~” aggregate microlocations of the active electronic matrix chip device;
- c) maintaining the alternating current in (b) for a sufficient length of time to allow the bioparticle of interest to aggregate at the aggregate microlocations;
- d) introducing onto the active electronic matrix chip device a solution comprising a detection immunoreagent specific for the bioparticle of interest;
- e) passing a direct current through one or more aggregate microlocations, wherein the electrodes under the aggregate microlocations are biased so as to attract the detection immunoreagent to the aggregate microlocations from the solution; and
- f) maintaining the direct current in (e) for a sufficient time to allow the detection immunoreagent to bind to the bioparticle of interest at the aggregate microlocation, thereby detectably labeling the bioparticle.

10. (Original) The method of claim 9 further comprising washing the permeation layer surface of the active electronic matrix chip device to remove undesired components of the sample solution mixture after step (c).

11. (Original) The method of claim 9 further comprising a detection step wherein the presence or absence of the detection immunoreagent is detected at one or more aggregate microlocations.

12. (Original) The method of claim 11 further comprising a washing step to remove unbound detection immunoreagent from the active electronic matrix chip device prior to the detecting step.

13. (Currently Amended) The method of claim 9 wherein at least one capture immunoreagent specific for the bioparticle of interest is attached to the permeation layer of the device at the aggregate microlocations, further wherein the alternating current in step (b) is maintained for a sufficient length of time to allow the at least one capture immunoreagent to bind to the bioparticle of interest.

14. (Original) The method of claim 9 wherein the bioparticle of interest adheres to the permeation layer of the aggregate microlocations due to the inherent physical or chemical properties of the bioparticle.

15-21. (Canceled)